

Charles Edward Hunt

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Department of Electrical
and Computer Engineering
University of California
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Education

Ph.D., Cornell University, 1986

Dissertation Title: "Rapid Zone Recrystallization using an Incoherent Light Line Source for Silicon on Insulator and Multilevel Integrated Circuits", Prof. Jeffrey Frey, Adviser

M.S.E.E., University of Utah, 1983

Thesis Title: "An Automated Integrated Circuit Parametric Testing System for Process Monitoring, Circuit Simulation, and Performance Verification", Prof. Robert Huber, committee chairman

B.S.E.E., University of Utah, 1980, Magna Cum Laude

Major Emphasis: integrated circuit technology, solid-state devices, electromagnetics and optics

Work Experience

Professor

July 1986 - present

(7/86-6/97, Asst./Assoc. Professor)

Electrical and Computer Engineering Department, University of California, Davis, CA. 95616, Prof. Norman Tien, Department Chair (530)752-0583

Independent research in vacuum microelectronics, semiconductor wafer bonding, Silicon On Insulator techniques, and IC fabrication processes, supervision of graduate students, teaching of solid-state device physics and integrated circuits fabrication series

Visiting Professor of Physics

Sept. 2002 - June 2003

Department of Electronics, University of Barcelona, Spain
Prof. Joan-Ramon Morante, Chair, (+34)93-402-1140

Research in Surface Science of IC structures and electronic materials

Visiting Scientist

Jan. 1990 - March 1990

IBM, General Technology Division, Dept. N54 Bldg. 966-2, Essex Junction, VT 05452, Dr. Dale Critchlow (IBM Fellow), Supervisor, (802)769-2814

Address technology issues related to low-temperature and selective epitaxy for electron devices. Collaborative research in memory process design.

Visiting Project Engineer Jun. 1993 - Oct 1994
Lawrence Livermore National Laboratory, Engineering Research Division,
Dr. Stephen Swierkowski, Supervisor, (510)422-8206

Research in technology issues related to semiconductor wafer bonding and vacuum microelectronics for flat-panel displays

Visiting Scientist June 1988 - July 1988
July 1989 - August 1989
Institut Für Mikroelektronik Stuttgart, Allmandring 30a, D-7000 Stuttgart, Federal Republic of Germany. Dr. Bernd Höfflinger, Director (011-49711)685-5860

Apply low-temperature epitaxial growth techniques to Si thin film deposition for fabricating Bonded SOI wafers. Co-investigator in the BE-SOI program at the Institute

Technical Consultant October 1986 - present
Engineering Research Division, Lawrence Livermore National Laboratory, Livermore, CA 94550, Dr. Raymond Mariella, Thrust Area Director (510)422-8905

Type-Q clearance, working with rapid thermal processing, formation of silicon membranes, pulse transient spectroscopy, GaAs CCD's, vacuum microelectronics, wafer bonding. Unclassified research in semiconductor processing

Graduate Research Assistant July 1983-July 1986
S.R.C. Microscience and Technology, Cornell University, Ithaca, NY 14853, Prof. Jeffrey Frey, Supervisor (301)454-1608

Design, development, construction, and use of experimental lab for silicon on insulator research. Also, materials characterization and IC processing

Electronics Engineer July 1980-July 1983 (full time)
1979-1980 (part time)
VLSI Research Group, University of Utah, Salt Lake City, UT 84112, Dr. Kent F. Smith, Supervisor (801)581-8653

Staff engineer responsible for IC design (NMOS, CMOS, I²L), testing, and CAD tool research; some supervision of students and staff, purchasing, and public relations.

Teaching Assistant 1978-1979 (part time)
Departments of Electrical Engineering and Mathematics, University of Utah, Salt Lake City, UT 84112

Teaching labs, grading homework, and tutoring.

Awards

1979 Josephine Beam Memorial Engineering Award
1979-1980 Boeing Aerospace Engineering Award
1980 University of Utah IEEE/EE Dept. Outstanding Student Award
1980 IEEE President's Service Award
1991, 1992 IBM Faculty Development Award
1993 Listed in *Who's Who in Science and Engineering*
1994 Listed in *Who's Who in the World*
1994 IEEE Senior Member

Associations

Member: IEEE (Student Associate Chairman 1979-1980, Faculty Advisor 1997-2002), the Electrochemical Society, the Materials Research Society (Faculty Advisor of UC Davis MRS Student Branch 1995-2000), Sigma Xi, Tau Beta Pi (Faculty Advisor CA-Λ 1993-96, 1998-01), Phi Kappa Phi

Service

Editor: *Solid-State Electronics*, Elsevier Scientific, July 1998 – December 2004
Member: Technical Program Committee, IEEE International SOI Conference 1987-1990;
Member: Materials Research Society Information Services Committee 1991-present;
Symposium Chair: Electrochemical Society Meeting, *International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications* 1993, 1995, 1997, 1999, 2001, 2003, 2005
Conference Chair: *International Vacuum Microelectronics Conference*, Davis, CA 2001
Member: Technical Advisory Board, *International Vacuum Microelectronics Conference*, 2001-present
Member: Executive Board, Industry-University Cooperative Research Program, University of California Office of the President, 2001-2005
Member: Academic Advisory Board, UC Davis Connect, 2003-present

PUBLICATIONS

1. 1981 K. F. Smith, T. M. Carter and C. E. Hunt. THE CMOS SLA IMPLEMENTATION AND SLA PROGRAM STRUCTURES. *VLSI Systems and Computations*, Kung, Sproull, and Steele Ed.'s, Computer Science Press, pp. 396-407.
2. 1982 K. F. Smith, T. M. Carter and C. E. Hunt. STRUCTURED LOGIC DESIGN OF INTEGRATED CIRCUITS USING THE STORAGE/LOGIC ARRAY (SLA). *IEEE Transactions on Electron Devices*, Vol. ED-29 No. 4, pp. 765-776; also *IEEE J. Solid State Circuits*, Vol. SC-17, No., 2, pp. 395-407.
3. 1983 C. E. Hunt. A SYSTEM FOR AUTOMATED TESTING OF MOS PROCESS, CIRCUIT SIMULATION, AND PERFORMANCE PARAMETERS. *Proceedings of the IEEE ICCAD*, IEEE Computer Society, 2 pages.
4. 1984 C. E. Hunt. SILICON THIN FILMS FOR MULTI-LEVEL INTEGRATED CIRCUITS. *Proceedings of the 6th Annual Program for Submicron Structures (PROSUS) Conference*, 1 page.
5. 1985 K. Kubota, C. E. Hunt and J. Frey. THERMAL PROFILES IN SILICON-ON-INSULATOR (SOI) MATERIAL RECRYSTALLIZED WITH SCANNING LIGHT LINE SOURCES. *Energy Beam - Solid Interactions and Transient Thermal Processing*, Biegelsen, Rozgonyi, and Shank, Ed.'s, *Proc. Mat. Res. Soc.*, Vol. 35, pp. 629-634.
6. 1985 K. Kubota, C. E. Hunt and J. Frey. THERMAL PROFILES DURING RECRYSTALLIZATION OF SILICON ON INSULATOR WITH SCANNING INCOHERENT LIGHT LINE SOURCES. *Applied Physics Letters*, Vol. 46, No. 12, pp. 1153-1155.
7. 1985 C. E. Hunt and J. Frey. RAPID ZONE RECRYSTALLIZATION USING A PULSED ARC LAMP. *Proceedings of the 7th Annual Program for Submicron Structures (PROSUS) Conference*, 1 page.
8. 1986 C. E. Hunt and J. Frey. ELECTRICAL AND PHYSICAL PROPERTIES OF RAPID-ZONE-RECRYSTALLIZED (SOI) MADE USING A PULSED ARC LAMP. *Proceedings of 18th International Conference on Solid State Devices and Materials*, pp. 561-564; also *Jap. J. Appl. Phys.*, Vol. S-18, 4 pages.
9. 1987 C. E. Hunt. ELECTRICAL MEASUREMENTS OF DEVICES FABRICATED IN PULSED ARC LAMP RAPID-ZONE-RECRYSTALLIZED SILICON ON INSULATOR. *IEEE Transactions on Electron Devices*, Vol. ED-34, No. 11, p. 2362; also *Digest of Technical papers, 45th Annual Device Research Conference*, p. IIB-8.
10. 1988 C. E. Hunt, J. N. Churchill, R. Bower and I-W. Chao. TRANSIENT SPECTROSCOPY TECHNIQUES IN SILICON-ON-INSULATOR MATERIALS. *From Materials To Devices, European Silicon On Insulator Workshop*, SEE Press, Meylan, France, F-13, 3pages.
11. 1988 C. E. Hunt. FILM UNIFORMITY IN BOND AND ETCH-BACK SILICON ON INSULATOR (BE-SOI). *Proceedings of the 1988 IEEE SOS/SOI Technology Workshop*, IEEE Press, p. 57.
12. 1989 R. P. Mariella, J. D. Morse, R. Aines, C. E. Hunt, PHOTOELECTRONIC PROPERTIES OF LOW TEMPERATURE GaAs GROWN ON GaAs AND SILICON SUBSTRATES BY MOLECULAR BEAM EPITAXY. *Proc. Mat. Res. Soc.* Vol. 145, pp. A6-11, 5 pages.
13. 1989 W. J. Orvis, C. F. McConaghy, D.R. Ciarlo, J. H. Yee, E. W. Hee, C. E. Hunt, J. Trujillo, MICRO-CAVITY INTEGRABLE VACUUM DIODES AND TRIODES, *Vacuum Microelectronics 1989*, R. E. Turner, Ed., The Institute of Physics Conference Series Number 99, Bristol, England, p. 207, 4 pages.

- 14 1989 W. J. Orvis, D. R. Ciarlo, C. F. McConaghy, J. H. Yee, E. Hee, C. E. Hunt, J. Trujillo, A PROGRESS REPORT ON THE LIVERMORE MINIATURE VACUUM TUBE PROJECT, *Digest of Technical Papers 1989 IEEE International Electron Devices Meeting*, Washington, DC, p. 529, 4 pages
- 15 1989 R. B. Marcus, T. S. Ravi, T. Gmitter, K. Chin, D. Liu, W. J. Orvis, D. R. Ciarlo, C. E. Hunt, J. Trujillo, FORMATION OF ATOMICALLY SHARP SILICON TIPS, *Digest of Technical Papers 1989 IEEE International Electron Devices Meeting*, Washington, DC, p. 884, 4 pages
- 16 1990 R. B. Marcus, T. S. Ravi, T. Gmitter, K. Chin, D. Liu, W. J. Orvis, D. R. Ciarlo, C. E. Hunt, J. Trujillo, FORMATION OF SILICON TIPS WITH < 1 NM RADIUS, *Appl. Phys. Lett.*, Vol. 56 (3), p. 236, 3 pages
- 17 1990 C. E. Hunt, G. V. Rouse, C. Harendt and M. L. Green, HIGHLY SELECTIVE ETCH STOP BY STRESS COMPENSATION FOR THIN-FILM BESOI, *Proceedings of the 1990 IEEE SOS/SOI Technology Conference*, IEEE Press, p. 145, 2 pages
- 18 1990 K. Ng, I-W. Chao, C. E. Hunt, J. N. Churchill, TRANSIENT SPECTROSCOPY OF DEEP LEVELS IN THIN SEMICONDUCTOR FILMS, Vol. 68, (12) *J. Appl. Phys.*, p. 6526, 3 pages
- 19 1990 N. Ula, G. Cooper, C. Davidson, S. P. Swierkowski and C. E. Hunt, SIMULATION, DESIGN, AND FABRICATION OF THIN-FILM RESISTIVE-GATE GaAs CHARGE COUPLED DEVICES, *Digest of Technical Papers 1990 IEEE International Electron Devices Meeting*, San Francisco, CA, p. 271, 4 pages
- 20 1991 J. Trujillo and C. E. Hunt, FABRICATION OF SILICON FIELD EMISSION POINTS FOR VACUUM MICROELECTRONICS BY WET CHEMICAL ETCHING, *Semicond. Sci. Technol.*, Vol. 6 (3), p. 223, 3 pages
- 21 1990 C. E. Hunt, SPECIAL REPORT: 1990 IEEE SOS/SOI TECHNOLOGY CONFERENCE: SESSION IV, "MATERIALS FABRICATION", (news article) *Solid-State Technology*, Vol. 34, No. 2, 1 page
- 22 1991 C. Harendt, C. E. Hunt, W. Appel, H. G. Graff, B. Höfflinger, E. Penteker, SILICON ON INSULATOR MATERIAL BY WAFER BONDING, *J. Electron. Materials.*, Vol. 20, No. 3, p. 267, 11 pages
- 23 1991 C. E. Hunt, BONDED WAFER SILICON ON INSULATOR MATERIAL, (invited) *Proceedings of the 7th Biennial Conference on Insulating Films on Semiconductors (INFOS '91)*, The University of Liverpool, England, pp. 4.D.21-24, 4 pages
- 24 1991 C. E. Hunt, J. T. Trujillo, and W. J. Orvis, STRUCTURE AND ELECTRICAL CHARACTERISTICS OF SILICON FIELD-EMISSION MICROELECTRONIC DEVICES, *IEEE Trans. Electron Dev.* Vol. 38, No. 10, 5 pages
- 25 1991 C. E. Hunt and C. A. Desmond, THINNING OF BONDED WAFERS: ETCH-STOP APPROACHES, (Invited) *Proceedings of the First International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications*, The Electrochemical Society Fall Meeting, Phoenix, AZ, 2 pages
- 26 1991 P. P. Pronko, A. W. McCormick, A. K. Rai, C. E. Hunt, C. A. Desmond and X. Chen, MATERIALS PROPERTIES AND CARRIER RECOMBINATION LIFETIMES IN THIN EPI-LESS BOND-ETCH SILICON ON INSULATOR (EL-BESOI), *Proceedings of the 1991 IEEE International SOI Conference*, IEEE Press, 2 pages

- 27 1991 C. E. Hunt, C. A. Desmond, D. R. Ciarlo, and W. J. Benett, DIRECT BONDING OF MICROMACHINED SILICON WAFERS FOR LASER DIODE HEAT EXCHANGER APPLICATIONS, *IOP Journal of Micromechanics and Microengineering*. Vol. 1, No. 3, 5 pages
- 28 1992 N. Ula, G. A. Cooper, J. C. Davidson, S. P. Swierkowski, and C. E. Hunt, OPTIMIZATION OF THIN-FILM RESISTIVE-GATE AND CAPACITIVE-GATE GaAs CHARGE-COUPLED DEVICES, *IEEE Trans. Electron Dev.* Vol. 39, No. 5, p. 1032, 9 pages
- 29 1992 J. T. Trujillo and C. E. Hunt, LOW-VOLTAGE SILICON GATED FIELD-EMISSION CATHODES FOR VACUUM MICROELECTRONICS AND E-BEAM APPLICATIONS, *Proceedings of the 5th International Vacuum Microelectronics Conference*, Vienna, Austria, July 13-17, p. 6-3, 2 pages
- 30 1992 W. Dawson Kesling and C. E. Hunt, FIELD EMISSION DEVICE MODELLING FOR APPLICATION TO FLAT PANEL DISPLAYS, *Proceedings of the 5th International Vacuum Microelectronics Conference*, Vienna, Austria, July 13-17, p. P2-20, 2 pages
- 31 1992 C. E. Hunt and C. A. Desmond, THINNING OF BONDED WAFERS: ETCH-STOP APPROACHES, *Semiconductor Wafer Bonding: Science, Technology and Applications*, U. Gösele, T. Abe, J. Haisma and M. A. Schmidt, Ed.s, The Electrochemical Society Proceedings Volume 92-7, p. 165-173 (extended version of #25)
- 32 1992 S. N. Farrens, B. Roberds, M. C. Boettcher, M. S. Ismael, R. W. Bower, C. A. Desmond and C. E. Hunt, MECHANICAL TESTING OF BONDED SILICON ON INSULATOR WAFERS, *Thin Films: Stresses and Mechanical Properties III*, W. D. Nix, J. Bravman, E. Arzt and L. B. Freund, Ed.s, Materials Research Society Proceedings, Volume 239B, pp. 287-292
- 33 1992 N. Ula, G. A. Cooper, J. C. Davidson, S. P. Swierkowski, and C. E. Hunt, DESIGN OPTIMIZATION AND MODELING OF HIGH SPEED GaAs CHARGE-COUPLED DEVICES, *Microwave Journal*, August, pp. 84-93
- 34 1992 D. E. Booth, C. E. Hunt, S. Glenn, R. L. Lander, S. Mani, and D. Pellett, DESIGN OF AN INTEGRATED SILICON PIXEL DETECTOR, *Proceedings of the 1992 Meeting of the Division of Particles and Fields*, American Physical Society, 3 pages
- 35 1993 W. Dawson Kesling and Charles E. Hunt, FIELD EMISSION DEVICE MODELING FOR APPLICATION TO FLAT PANEL DISPLAYS, *Journal of Vacuum Science Technology B*, Vol. B 11 (3) 518, 5 pages
- 36 1993 J. T. Trujillo and C. E. Hunt, LOW-VOLTAGE SILICON GATED FIELD-EMISSION CATHODES FOR VACUUM MICROELECTRONICS AND E-BEAM APPLICATIONS, *Journal of Vacuum Science Technology B*, Vol. B 11 (3) 454, 5 pages
- 37 1993 W. D. Kesling and C. E. Hunt, FIELD EMISSION DISPLAY RESOLUTION, *SID 93 Digest*, p. 599, 4 pages
- 38 1993 Andrei G. Chakhovskoi, W. Dawson Kesling, and Charles E. Hunt, PHOSPHOR SELECTION CONSTRAINTS IN APPLICATION OF GATED FIELD-EMISSION MICRO-CATHODES TO FLAT-PANEL DISPLAYS, *Proceedings of the 6th International Vacuum Microelectronics Conference*, Newport, Rhode Island, July 12-16, , p. 141, 2 pages
- 39 1993 Cynthia A. Desmond, Charles E. Hunt and Shari. N. Farrens, THE EFFECTS OF PROCESS-INDUCED DEFECTS ON THE CHEMICAL ELECTIVITY OF HIGHLY-DOPED BORON ETCHSTOPS, *Proceedings of the Second International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications*, The Electrochemical Society Spring Meeting, Honolulu, HI, pp. 423-432

- 40 1993 S. N. Farrens, B. E. Roberds, J. K. Smith, and C. E. Hunt, ANALYSIS OF BOND CHARACTERISTICS IN Si DIRECT-BONDED MATERIALS, *Proceedings of the Second International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications*, The Electrochemical Society Spring Meeting, Honolulu, HI, pp. 81-95
- 41 1993 James A. Folta, Charles E. Hunt, and Shari N. Farrens, LOW TEMPERATURE WAFER BONDING OF SURFACES USING A REACTIVE SPUTTERED INTERLAYER, *Proceedings of the Second International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications*, The Electrochemical Society Spring Meeting, Honolulu, HI, pp. 107-113
- 42 1993 Donald E. Booth, Charles E. Hunt, and Sudhindra Mani, FULL THREE DIMENSIONAL MICROCIRCUIT INTEGRATION TECHNIQUES USING WAFER BONDING, *Proceedings of the Second International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications*, The Electrochemical Society Spring Meeting, Honolulu, HI, pp. 293-302
- 43 1994 Cynthia A. Desmond, Charles E. Hunt and Shari. N. Farrens, THE EFFECTS OF PROCESS-INDUCED DEFECTS ON THE CHEMICAL SELECTIVITY OF HIGHLY-DOPED BORON ETCHSTOPS, *Journal of the Electrochemical Society*, Volume 141, No. 1, pp. 178-184 (expanded version of #39)
- 44 1994 Andrei G. Chakhovskoi, W. Dawson Kesling, Johann T. Trujillo, and Charles E. Hunt, PHOSPHOR SELECTION CONSTRAINTS IN APPLICATION OF GATED FIELD-EMISSION MICRO-CATHODES TO FLAT PANEL DISPLAYS, *Journal of Vacuum Science Technology B*, Volume 12, No. 2, 5 pages (expanded version of #37)
- 45 1994 M. A. Schmidt, T. Abe, C. E. Hunt and H. Baumgart, Editors, SEMICONDUCTOR WAFER BONDING SCIENCE, TECHNOLOGY, AND APPLICATIONS II, (Book) *The Electrochemical Society Softbound Series*, Proceedings Volume 93-29, The Electrochemical Society, Pennington NJ, 485 pages
- 46 1994 Cynthia A. Desmond, Charles E. Hunt and Tom Wetteroth, CHARACTERIZATION OF THIN-FILM BESOI USING A CVD $\text{Si}_{1-x-y}\text{Ge}_x\text{B}_y$ ETCH STOP, *Proceedings of the Seventh International Symposium on Semiconductor On Insulator Technology*, The Electrochemical Society Spring Meeting, San Francisco, CA, 11 pages
- 47 1994 Cynthia A. Desmond, Charles E. Hunt and Scott D. Collins, P+ REMOVAL TECHNIQUES FOR THIN-FILM BESOI, *Proceedings of the International Symposium on Semiconductor Silicon*, The Electrochemical Society Spring Meeting, San Francisco, CA, 6 pages
- 48 1994 W. Dawson Kesling and Charles E. Hunt, BEAM FOCUSSING FOR FIELD EMISSION FLAT PANEL DISPLAYS, *Proceedings of the 7th International Vacuum Microelectronics Conference*, Grenoble, France, July 4-7, , p. 135, 4 pages
49. 1994 James A. Folta, Charles E. Hunt, and Shari N. Farrens, LOW TEMPERATURE WAFER BONDING OF SURFACES USING A REACTIVE SPUTTERED INTERLAYER, *Journal of the Electrochemical Society*, Vol. 141, pp. 2157-2160 (expanded version of #41)
50. 1994 S. N. Farrens, B. E. Roberds, J. K. Smith, and C. E. Hunt, A KINETICS STUDY OF THE BOND STRENGTH OF DIRECT BONDED WAFERS, *Journal of the Electrochemical Society*, Vol. 141, pp. 3225-3230 (expanded version of #40)
51. 1995 W. Dawson Kesling and Charles E. Hunt, BEAM FOCUSING FOR FIELD-EMISSION FLAT-PANEL DISPLAYS, *IEEE Trans. Electron Dev.*, Vol. 42, No. 2, pp. 340-347
- 52 1995 C. E. Hunt, H. Baumgart, S. S. Iyer, T. Abe, and U. Gösele, Editors, SEMICONDUCTOR WAFER BONDING PHYSICS AND APPLICATIONS III, (Book) *The Electrochemical Society Softbound Series*, Proceedings Volume 95-7, The Electrochemical Society, Pennington NJ, 610 pages

- 53 1995 D. E. Booth, C. E. Hunt, W. E. Brown and R. J. Stover, LOW TEMPERATURE ADHESION BONDING METHODS, *Proceedings of the Third International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications*, The Electrochemical Society Spring Meeting, Reno, NV, pp. 201-211
- 54 1995 Johann T. Trujillo, Andrei Chakhovskoi and Charles E. Hunt, LOW VOLTAGE SILICON FIELD EMITTERS WITH GOLD GATES, *Proceedings of the 8th International Vacuum Microelectronics Conference*, Portland, OR, July 30-Aug. 3, pp. 42-46
- 55 1995 Charles E. Hunt and W. Dawson Kesling, FIELD PENETRATION, ELECTRON SUPPLY AND EFFECTIVE WORK FUNCTION IN SEMICONDUCTOR FIELD-EMISSION CATHODES, *Proceedings of the 8th International Vacuum Microelectronics Conference*, Portland, OR, July 30-Aug. 3, p 221
- 56 1995 M. E. Malinowski, K. D. Stewart, D. A. A. Ohlberg, T. E. Felter, A. G. Chakhovskoi, C. E. Hunt, L. E. Shea, B. E. Russ, J. B. Talbot and J. McKittrick, GAS DESORPTION FROM FEA-PHOSPHOR SCREEN PAIRS, *Proceedings of the 8th International Vacuum Microelectronics Conference*, Portland, OR, July 30-Aug. 3, pp. 202-206
- 57 1995 Eileen M. Coons, Charles E. Hunt, Nazmul Ula, Everret E. King and Peter Leonov, MODELING OF SELF-ALIGNED LATERAL BIPOLAR TRANSISTORS ON THIN-FILM BONDED SILICON ON INSULATOR, *Proceedings of the Fourteenth IASTED International Conference, "Modeling, Identification and Control"*, Feb. 20-22, pp. 63-66
- 58 1995 A. A. Talin, M. E. Malinowski, T. E. Felter, A. G. Chakhovskoi and C. E. Hunt, OPERATION OF FEA-PHOSPHOR SCREEN PAIRS, *Proceedings of the First International Display Phosphors Conference*, San Diego, CA, Nov. 14-16, pp. 287-290
- 59 1995 V. D. Bondar, M. Ya. Grytsiv, A. S. Grodzinsky, M. Ya. Vasylyv, A. G. Chakhovskoi, C. E. Hunt, M. E. Malinowski and T. E. Felter, ENERGY-CONTROLLED VARIABLE COLOR THIN FILM LUMINESCENT SCREENS, *Proceedings of the First International Display Phosphors Conference*, San Diego, CA, Nov. 14-16, pp. 283-286
- 60 1996 K. K. Vossough and Charles E. Hunt, REACTIVE PLASMA SPUTTER DEPOSITION OF SILICON OXIDE, *Materials Reliability in Microelectronics VI*, W. F. Filter, J. J. Clement, A. S. Oates, R. Rosenberg and P. M. Lenahan, Ed.s, Materials Research Society Proceedings, Volume 428, pp. ____ (8 pages)
- 61 1996 A. G. Chakhovskoi, M. E. Malinowski, A. A. Talin, T. E. Felter, J. T. Trujillo, C. E. Hunt and K. D. Stewart, CHARACTERIZATION OF Y₂SiO₅:Ce, YAG:Tb, and YAG:Eu RGB PHOSPHOR TRIPLET FOR FIELD EMISSION DISPLAY APPLICATIONS, *Flat Panel Display Materials II*, M. Hatalis, J. Kanicki, C. J. Summers and F. Funada, Ed.s, Materials Research Society Proceedings, Volume 424, pp. ____ (6 pages)
- 62 1996 Johann T. Trujillo, Andrei Chakhovskoi and Charles E. Hunt, EFFECTS OF VACUUM CONDITIONS ON LOW-FREQUENCY NOISE IN SILICON FIELD EMISSION DEVICES, *Proceedings of the 9th International Vacuum Microelectronics Conference*, St. Petersburg, Russia, July 7-12, pp. 133-137
- 63 1996 A. G. Chakhovskoi, M. E. Malinowski, A. A. Talin, T. E. Felter and C. E. Hunt, CHARACTERIZATION OF NOVEL POWDER AND THIN-FILM RGB PHOSPHORS FOR FIELD EMISSION DISPLAY APPLICATIONS, *Proceedings of the 9th International Vacuum Microelectronics Conference*, St. Petersburg RUSSIA, July 7-12, pp. 614-618

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- 65 1996 D. Ravichandran, Rustum Roy, A. G. Chakhovskoi, W. B. White and C. E. Hunt, ALKOXIDE DERIVED FIELD EMISSION DISPLAY PHOSPHORS, *Proceedings of the Second International Display Phosphors Conference*, San Diego, CA, Nov., pp. 219-222
- 66 1996 A. G. Chakhovskoi, C. E. Hunt, B. K. Wagner, C. J. Summers, M. E. Malinowski and T. E. Felter, CHARACTERIZATION OF NEW THIN-FILM SrGa₂S₄ PHOSPHORS FOR LOW-TO-MEDIUM-ENERGY CATHODOLUMINESCENT DISPLAYS, *Proceedings of the Second International Display Phosphors Conference*, San Diego, CA, Nov., pp. 273-276
- 67 1996 A. G. Chakhovskoi, M. E. Malinowski, T. E. Felter, C. E. Hunt, J. McKittrick and G. A. Hirata, CHARACTERIZATION OF NOVEL LUMINESCENT FILMS FOR FIELD EMISSION FLAT PANEL DISPLAY APPLICATION, *Proceedings of the Fall Meeting of the American Vacuum Society*, Philadelphia, PA, Nov.
- 68 1997 D. Ravichandran, Rustum Roy, A. G. Chakhovskoi, C. E. Hunt, W. B. White and S. Erdei, FABRICATION OF Y₃Al₅O₁₂:Eu THIN FILMS AND POWDERS FOR FIELD EMISSION DISPLAY APPLICATIONS, *Journal of Luminescence*, Vol 71, no. 4, pp. 291-297
- 69 1997 V. D. Bondar, M. Ya. Grytsiv, A. S. Grodzinsky, M. Ya. Vasylyv, A. G. Chakhovskoi, C. E. Hunt, M. E. Malinowski and T. E. Felter, THIN-FILM ENERGY-CONTROLLED VARIABLE COLOR CATHODOLUMINESCENT SCREENS, *Journal of The Electrochemical Society*, Vol. 144, No. 2, pp. 704-707
- 70 1997 Johann T. Trujillo, Andrei Chakhovskoi and Charles E. Hunt, EFFECTS OF VACUUM CONDITIONS ON LOW-FREQUENCY NOISE IN SILICON FIELD EMISSION DEVICES, *Journal of Vacuum Science Technology B*, Vol. 15, No.2, pp. 401-404
- 71 1997 Charles E. Hunt and Andrei G. Chakhovskoi, THE PHOSPHOR CHALLENGE FOR FIELD-EMISSION FLAT-PANEL DISPLAYS, (invited review) *Journal of Vacuum Science Technology B*, Vol. 15, No.2, pp. 516-519
- 72 1997 A. G. Chakhovskoi, M. E. Malinowski, A. A. Talin, T. E. Felter and C. E. Hunt, CHARACTERIZATION OF NOVEL POWDER AND THIN-FILM RGB PHOSPHORS FOR FIELD EMISSION DISPLAY APPLICATIONS, *Journal of Vacuum Science Technology B*, Vol. 15, No.2, pp. 507-511
- 73 1997 A. G. Chakhovskoi, C. E. Hunt, T. Yang, B. K. Wagner, C. J. Summers, M. E. Malinowski and T. E. Felter, CHARACTERIZATION OF THIN-FILM BLUE SrGa₂S₄ PHOSPHORS FOR LOW TO MEDIUM ENERGY CATHODOLUMINESCENT DISPLAYS, *Journal of the Society for Information Display*, Vol. 6, no. 3, pp. 185-189
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ORAL PRESENTATIONS (Invited Lectures and Conference Presentations)

1. 1983 THE CMOS SLA IMPLEMENTATION AND SLA PROGRAM STRUCTURES. Presented to the CMU Conference on VLSI Systems and Computations, Pittsburgh, PA, October 20.
2. 1983 A SYSTEM FOR AUTOMATED TESTING OF MOS PROCESS, CIRCUIT SIMULATION, AND PERFORMANCE PARAMETERS. Presented to the IEEE International Conference on Computer-Aided Design, Santa Clara, CA, September 13.
3. 1984 THERMAL PROFILES IN SILICON-ON-INSULATOR MATERIAL RECRYSTALLIZED WITH SCANNING LIGHT LINE SOURCES. Presented to the Materials Research Society 1984 Fall Meeting, Boston, MA, November 26-30 .
4. 1985 SILICON-ON-INSULATOR TECHNOLOGY AND MULTI-LEVEL INTEGRATED CIRCUITS. (Invited) Semiconductor Technology Division, Digital Equipment Corporation, Hudson, MA, February 22.
5. 1985 RAPID ZONE RECRYSTALLIZATION OF SILICON USING A PULSED ARC LAMP. Presented to the IEEE SOS/SOI Technology Workshop, Park City, Utah, October 1-3. (See also 7A)
6. 1986 ELECTRICAL AND PHYSICAL PROPERTIES OF RAPID-ZONE-RECRYSTALLIZED (SOI) MADE USING A PULSED ARC LAMP. Presented to the 18th International Conference of Solid State Devices and Materials, Tokyo, Japan, August 20-22 (see also 8A).
7. 1987 ELECTRICAL MEASUREMENTS OF DEVICES FABRICATED IN PULSED ARC LAMP RAPID-ZONE-RECRYSTALLIZED SILICON ON INSULATOR. Presented to the 45th IEEE Device Research Conference, Santa Barbara, CA, June 26.
8. 1987 SILICON-ON-INSULATOR APPLICATIONS TO CCD IMAGER TECHNOLOGY. (Invited) CCD Products Group, Tektronix, Inc., Beaverton, OR, February.
9. 1988 TRANSIENT SPECTROSCOPY TECHNIQUES IN SILICON ON INSULATOR MATERIALS. Presented at the European SOI Workshop, Meylan , France, March 16.
- 10 1988 MATERIALS ISSUES AND APPLICATIONS OF SILICON ON INSULATOR (SOI) BY BOND AND ETCH-BACK (BE-SOI). (Invited) Institut Für Mikroelektronik Stuttgart, Stuttgart, FRG, March 18.
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- 15 1989 WAFER BONDING FOR SOI: MATERIALS, TECHNIQUES, AND DEVICE APPLICATIONS. (Invited) Institut Für Mikroelektronik Stuttgart, Stuttgart, FRG, August 16.

- 16 1990 STAB FROM THE PAST: THE (MINIATURE) RETURN OF VACUUM ELECTRONICS. (Invited) IBM Research Div, Eastview Research Laboratory, Yorktown Heights, NY., February 20
- 17 1990 STRUCTURE AND ELECTRICAL CHARACTERISTICS OF SILICON FIELD-EMISSION MICROELECTRONIC DEVICES, Presented at the Third International Vacuum Microelectronics Conference, Monterey, CA, July 24
- 18 1990 HIGHLY SELECTIVE ETCH STOP BY STRESS COMPENSATION FOR THIN-FILM BESOI, Presented at the 1990 IEEE SOS/SOI Technology Conference, Key West, FL, October 3
- 19 1991 BONDED WAFER SILICON ON INSULATOR MATERIAL (invited), Presented at the 7th Biennial Conference on Insulating Films on Semiconductors, The University of Liverpool, England, April 5
- 20 1991 METHODS FOR FABRICATION OF THIN-FILM BESOI FOR CMOS APPLICATIONS (Invited) Institut Für Mikroelektronik-Stuttgart, Stuttgart, FRG, April 9.
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- 22 1991 THINNING OF BONDED WAFERS: ETCH-STOP APPROACHES, (Invited) the First International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications, The Electrochemical Society Fall Meeting, Phoenix, AZ, Oct 15
- 23 1993 PREPARATION OF ULTRATHIN SILICON WINDOWS FOR X-RAY OPTICS, (invited) Lawrence Livermore National Laboratory, Advanced X-Ray Optics Group, Livermore, CA, January 19.
- 24 1993 LOW TEMPERATURE WAFER BONDING OF SURFACES USING A REACTIVE SPUTTERED INTERLAYER, the Second International Symposium on Semiconductor Wafer Bonding Science, Technology and Applications, The Electrochemical Society Spring Meeting, Honolulu, HI, May 18.
- 25 1994 APPLICATION OF SILICON FIELD-EMISSION COLD CATHODES TO FLAT-PANEL DISPLAYS, (invited) ARPA Phosphor Technology Center of Excellence FED Workshop, University of Florida, Jan. 7.
- 26 1994 TIPS AND BONDS: THE RENAISSANCE IN MICROFABRICATION, Industrial Affiliates Program, Department of Electrical and Computer Engineering, University of California, Davis, CA, January 28.
- 27 1994 CATHODOLUMINESCENT FLAT PANEL DISPLAYS USING SILICON FIELD-EMISSION VACUUM MICROELECTRONIC ELECTRON SOURCES, Advanced Displays Technologies International School (ADTIS), University of Lviv, Ukraine, August 29
- 28 1995 FIELD-EMISSION VACUUM MICROELECTRONIC FLAT-PANEL DISPLAYS (Invited), *American Vacuum Society Workshop on Flat-Panel Displays*, San Jose, CA June 21
- 29 1995 THE CURRENT STATUS OF RESEARCH IN FIELD-EMISSION VACUUM MICROELECTRONIC FLAT-PANEL DISPLAYS (Invited), *8th International Vacuum Microelectronics Conference*, Portland, OR, Aug. 2
- 30 1996 THE PHOSPHOR CHALLENGE FOR FIELD-EMISSION FLAT-PANEL DISPLAYS, (Invited) 9th International Vacuum Microelectronics Conference, St. Petersburg RUSSIA, July 7-12

- 31 1996 WAFER BONDING RESEARCH AT THE UNIVERSITY OF CALIFORNIA AT DAVIS. (Invited) Max-Planck-Institute for Microstructure Physics, Halle, Germany, July 12
- 32 1999 STABILITY CONDITIONING OF CARBON FIELD EMISSION SURFACES (Invited) First European Conference on Field Emission, EURO-FE99, University of Toledo, Spain, European Physical Society, Nov. 18
- 33 2001 AN OVERVIEW OF THE UC DAVIS VACUUM MICROELECTRONICS PROGRAM, (Invited), The Aerospace Corporation Seminar Series, El Segundo, CA
- 34 2001 FIELD EMISSION CATHODE DESIGN AND APPLICATION, (Invited) Jet Propulsion Laboratory Nanostructures Seminar Series, Pasadena, CA, October 18
- 35 2002 CHALLENGES AND NEW APPLICATIONS IN VACUUM MICROELECTRONICS: A LOOK AT IVMC-2001, (Invited) Third IEEE International Vacuum Electronics Conference, Monterey, CA
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- 39 2004 ION-BEAM MORPHOLOGICAL CONDITIONING OF CARBON FIELD EMISSION CATHODE SURFACES, 17th International Vacuum Microelectronics Conference IVMC-2004, Boston, MA, July 16
- 40 2004 C. E. Hunt, APPLICATION OF VITREOUS AND GRAPHITIC LARGE-AREA CARBON SURFACES AS FIELD-EMISSION CATHODES, (invited-plenary talk) International Vacuum Electronics Sources Conference IVESC-2004, Beijing, China, September 7